MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017 SESSION

TDC1231 – DATA COMMUNICATIONS AND NETWORKING

(All Sections / Groups)

25th February 2017
9.00a.m. – 11.00a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 4 printed pages including cover page with 5 questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of marks for each question is given.

3. Please write all your answer in the Answer Booklet provided.

Question 1

a) There are four categories of physical topology in data communications.
   i) State ONE (1) advantage and ONE (1) disadvantage of each type respectively. [4 marks]
   ii) What is the consequence if a connection fails in a mesh topology? [1 mark]
   iii) Draw a hybrid topology with a star backbone and three ring networks. [2 marks]

b) TCP/IP is a five-layer hierarchical protocol suite developed for the communication between hosts.
   i) State the difference between transport layer delivery and network layer delivery. [2 marks]
   ii) List TWO (2) responsibilities of the data link layer. [1 mark]
   iii) Identify FOUR (4) services provided by the application layer. [2 marks]

Question 2

a) Describe the difference between a low-pass channel and a band-pass channel. [2 marks]

b) i) What is the bit rate for a signal in which 1 bit lasts 2 ms? [2 marks]
   ii) A device is sending out data at the rate of 1000 bps. How long does it take to send out a single character (8 bits)? [2 marks]

c) A signal travels from point A to point B. At point A the signal power is 100W. At point B the power is 90W. What is the attenuation in decibels? [2 marks]

d) A signal with 200 milliwatts power passes through 10 devices, each with an average noise of 2 microwatts.
   i) What is the SNR? [2 marks]
   ii) What is the SNR_{dB}? [2 marks]

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Question 3

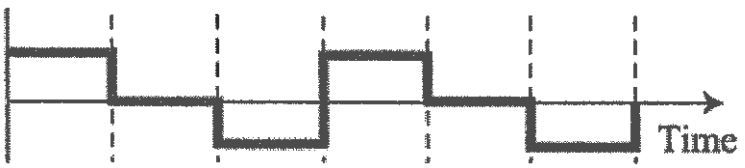
a) Communication between two devices can be simplex, half-duplex and full-duplex. Briefly explain these THREE (3) data flow and prepare ONE (1) example for each. [3 marks]

b) Discover TWO (2) advantages of optical fiber over twisted-pair and coaxial cable. [2 marks]

c) Demonstrate the difference between sky propagation and light-of-sight propagation. [2 marks]

d) Given data stream 00110011, assuming that the last signal level has been positive. Prepare the graph for the following schemes.
i) NRZ – I scheme [1 mark]
ii) Differential Manchester scheme [1 mark]

e) Find the data stream for following AMI bipolar scheme.



[1 mark]

f) Produce the result of B8ZS scrambling coding scheme for the sequence **11100000000000** using the scrambling techniques. Assume that the last non-zero signal level has been negative. [2 marks]

Question 4

a) Represent an augmented dataword of 1110000 and a divisor of 1011 in polynomial representation. Then, estimate the codeword in polynomial representation. [2 marks]

b) Explain the goals of multiplexing and list THREE (3) main multiplexing techniques. [4 marks]

c) Briefly explain the analog hierarchy used by telephone companies and list different levels of the hierarchy. [4 marks]

d) We need to transmit 100 digitized voice channels using a passband channel of 20 KHz. Estimate the ratio of bits/Hz if we use no guard band. [2 marks]

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Question 5

a) Datagram and virtual-circuit need a routing table to find the output port from which the information belonging to a destination should be sent out, but a circuit-switched network has no need for such a table. Explain the reason for this difference. [4 marks]

b) i) Estimate the minimum data size in the Standard Ethernet. [1 mark]
ii) If an Ethernet MAC sub layer receives 43 bytes of data from the upper layer, how many bytes of padding must be added to the data? [1 mark]

c) Explain the THREE (3) types of mobility in a wireless LAN. [3 marks]

d) Explain the basis for membership in a VLAN and explain how a VLAN reduces network traffic. [3 marks]

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